A future communication will show how these colloid chemical facts may be used in the erection of secretory models which, like the salivary gland or kidney, yield "secretions" either more alkaline or more acid than the allegedly neutral (or even acid or alkaline) tissues.

It has proved impossible to find an editor with space available for the details of the experiments outlined above and previously reported upon. They must in consequence be brought out in a book. But since the making of such takes time, it has seemed of interest to make a preliminary report upon work which has at various times been lectured upon to different scientific audiences.

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May 5, 1919

THE BUFFALO MEETING OF THE AMERICAN CHEMICAL SOCIETY. III

Testing the mildew resistance of fabrics: F. P. VEITCH and S. S. LEVINE. A method has been devised for testing the mildew resistance of fabrics treated by so-called mildew-proofing processes. The method takes into consideration the important determining mold growth and is conducted in the laboratory under conditions which are highly favorable to the development of mildew and which are carefully controlled. It is briefly described as follows: Six discs about 3.5 inches in diameter are cut from the sample to be tested and soaked in running tap water for two or three days in order to wash out easily removable fungicides and fermentable matter. The damp discs are placed in petri plates containing ten to fifteen cubic centimeters of agar jelly from nutrient matter. The plates are then incubated for seven to ten days in a dark chamber at from 20° C. to 25° C. The condition of the fabric as to the color, extent and character of the growth are observed and recorded. Following this pre-inoculation period the discs are inoculated with pure cultures of several species of molds and reincubated for three weeks to a month and examined each week for mold growth. The observed conditions are rated on a scale of ten. At the conclusion of the tests the discs are washed and preserved as records. The test is a severe one which is borne perfectly for the full period only by canvas treated by the cupra-ammonium process. Its utility has been demonstrated, however, by the fact that canvas which gives a rating of 6 or better has not mildewed on exposure to the weather at Washington, D. C., during the summer and fall months.

Testing materials for increasing the water resistance of sole leather: H. P. HOLMAN and F. P. VEITCH. To determine waterproofing value, several pieces of sole leather which are always of the same tannage and from the same section of the hide but which differ in texture are impregnated by immersing in the treating material for ten minutes at 60° C., followed by warming in an oven at 60° for fifteen minutes. Water absorption is determined by soaking in water for twenty-four hours, with periodical flexing, and weighing the wet leather after removing all excess from the surface. The leather is also weighed before treating, after treating, and in the air dry condition after testing. From these weights the quantity of treating material taken up by the leather, the actual water absorption, and the loss in weight on testing are calculated in percentages. The actual water absorption is calculated on the basis of the final dry weight. All dry weights should be made after exposing the leather to the same atmospheric humidity. Eighty samples, including practically all the commercial materials used in waterproofing sole leather, were tested by this method. Only twenty were found to waterproof sole leather sufficiently to prevent its absorbing an average of more than 35 per cent. of water under the conditions of the test. This percentage was arbitrarily adopted as a limit for satisfactory materials for increasing the water resistance of sole leathers.

Method for determining the water resistance of fabrics: F. P. VEITCH and T. D. JARRELL. In developing more effective methods of making canvas water- and mildew-resistant, and for testing for the War Department deliveries of canvas and clothing for water resistance, it was necessary to employ methods of testing that are both expeditious and indicative of the effectiveness and durability of the treatment. Modifications of the old bag or funnel and of the spray test have been devised which have proved very satisfactory in that all canvas given high ratings by these methods have been found to be water resistant during six months of outdoor exposure throughout the summer and fall. Of the two, the spray test yields possibly the most information. Neither the de-

termination of permeability to water under pressure, nor of water absorption added to the information given by the funnel and spray tests. Fabrics widely different in water resistance showed practically no difference in the quantity of water absorbed in a given time. Details of the methods, including the method of making the exposure tests, illustrations of the equipment and the scale of numerical ratings used, are given in the paper which is to be followed by other dealing with water- and mildew-proofing treatments and with the deterioration caused by such treatments on outdoor exposure.

An impact tester for solid and corrugated fiber board: E. O. REED and F. P. VEITCH. Since the usual methods of testing solid and corrugated fiber board by determining its bursting strength with a Mullen Tester was found unsatisfactory, an impact tester has been devised which closely imitates conditions which fiber board containers must meet in actual service. The results obtained are stated in terms of the height from which a 2-kilogram hammer must be dropped in order to drive a one kilogram plunger, having a spherical base of definite dimensions, through a definite unsupported area of the board. The tester should be useful in establishing impact requirements of different weights of fiber board. Results so far obtained indicate that with this tester data are obtained which are not only a measure of the bursting strength, but also of the resiliency of the board, which are the two main factors determining serviceability.

Waterproof papers for box lining and bale wrapping: F. P. VEITCH and E. O. REED. During the war there has been an increased demand for waterproof papers for box-lining and bale-wrapping purposes due especially to the fact that for overseas shipment, army and navy supplies had to be put in the most compact form and were baled whenever it was possible. Many types of wrapping papers proposed for protecting the contents of bales and boxes against moisture have been subjected to laboratory and actual bailing tests to determine the relative merits of different methods of waterproofing and the probable serviceability of different types of paper as indicated by such test. Very definite information on the most water-resistant types of wrapping paper has been secured.

Lead-coated Iron (exhibits): CHAS. BASKERVILLE. A process for coating sheet iron, iron wire and wire gauze has been worked out depending in part upon dipping the article after the usual pickling and washing into a solution of antimony chloride, thence through a suitable supernatant flux into a bath of molten lead or antimony lead, withdrawing and quenching in oil. Shingles, 10 × 16 ins., of 28 g. iron thus coated, painted and unpainted, have been exposed to the weather in a roof test for two years and eleven months and show 100 per cent. efficiency, that is no rust spots. The shingles may be bent at various angles without cracking the coating and exposing the iron. It is superior to and less expensive than tin plates. Shingles exposed near the exits of sulphuric acid chambers soon show rust, due probably to condensation of nitrous and nitric acids, whose solvent action on lead is well known. Thin sheet iron thus coated is easily pressed into desired shapes, for example, hub caps for motor vehicles, the lead acting as a lubricant. The pressed article lends itself well to nickel plating and subsequent burnishing. Wire gauze (chicken wire), thus lead coated, is quite as good as the galvanized article and cheaper to produce. Heavy steel pipe, 8-inch for pipe lines, was not successfully coated for practical purposes, due to irregularities in the surface and the abrasions produced in the surface and its softer coating, when chains and tongs were applied in screwing the joints together. Where iron in juxtaposition to lead is exposed to aerated water (practical conditions) through incomplete coating (pinholes) or abrasion of the lead, the iron rusts more rapidly as it is electropositive to lead. This is also true for tin-coated iron, while the opposite is true for galvanized iron. However, for some purposes lead-coated metal possesses advantages, especially in expense. Cast iron requires a preliminary pickling in hydrofluoric acid, when it may be coated by the process given, but not perfectly, due to the irregularities of surface. However, this thin coating serves as a satisfactory binding agent for thick layers of lead cast thereon, for example in filter press plates. This was found to be true also for the rough drilled interior of shells; electrolytically deposited lead, with subsequent burnishing, has been found superior for lead coating the interior of gas shells requiring such protection.

Reinforced lead (exhibits): CHAS. BASKERVILLE. Lead in large sheets or heavy pipe flows. Various devices, as numerous straps for sheets, serving as walls in acid chambers, frequently placed supports for pipes, walls of masonry holding sheet lead linings in large petroleum refining tanks, and so forth, are utilized to reduce the sagging.

Vacuum pipes of lead must be of unusual thickness and great weight to prevent collapsing. Iron and steel pipe with lead lining is extensively used, the lead protecting the iron or steel, but the latter also prevents bulging of the lead when the necessary pressure is applied to move the liquids thus transported. These difficulties have been overcome in large part by reinforcing lead with iron or steel gauze in much the same manner that glass is reinforced by wire netting. Wire netting of various sizes of mesh is given a coating of lead or lead-antimony, as described in another paper, and is imbedded in sheet lead of a thickness about one quarter greater than desired, this is then rolled while cold. Reinforced lead in sheets 5 ft. × 6 ins., have been made. They may be bent or cut as desired. Joints have been burned together or finished without leaving any iron exposed. Skeleton frameworks of metal lined with reinforced lead sheeting serve as tanks and other containers without sagging. Eight-inch pipe made of one quarter inch thick reinforced lead withstood a pressure of eight times that of an eight-inch pipe made of seven eighths inch thick lead before collapsing.

Utilization of asphaltic base acid sludge from petroleum: Chas. Baskerville. Instead of cooking the asphaltic base residue with the mixed sulphuric acid to carbonization and then burning the mass mixed with coal as fuel, the present practise, the cooking is carried on at a much lower temperature and for much shorter time. The acid mass separates into three layers, lighter residues being on top, and the heavy sulphuric acid being at the bottom. These are drawn off, leaving the middle portion of asphaltic material containing 15–25 per cent. of sulphuric acid. The proper amount of dry slaked lime is thoroughly mixed with this asphaltic base in a suitable mill. The heat of neutralization is sufficient to fuse the asphalt, which mixed with the calcium sulphate produced, flows into suitable containers, and solidifies on cooling. The mass, which contains 20 to 40 per cent. of calcium sulphate, may be melted and applied where desired, as in the common practise. Time tests have demonstrated the value of the material thus produced for waterproofing (wood and concrete), roofing, road material and as a protective covering for metals. The process is covered by U. S. Patent 1,231,985.

Equilibrium studies on the Bucher process: John B. Ferguson and P. D. V. Manning. A quantitative study of the deleterious effects of carbon monoxide in the furnace gases upon the cyanide conversion at two temperatures, 946° and 1,000° C. The experimental methods employed and results obtained will be presented.

Design for electrically heated bomb for ammonia synthesis (lantern): R. O. E. Davis and H. Bryan. The bomb consists of a nickel-chromium-iron alloy of sufficient strength to withstand several hundred atmospheres pressure. It is electrically heated by a specially devised heater. The method of insulating the walls is shown as are also the method of introducing the catalyst container, and the electric leads.

Purification of compressed gases in testing catalysts for ammonia synthesis (lantern): R. O. E. Davis. The method used in removal of moisture, carbon monoxide, carbon dioxide and oxygen is described and the type of purification chamber used is shown. It is pointed out how necessary it is to have very pure gas in the tests.

Preparation of nitrogen and hydrogen mixture by decomposition of ammonia (lantern): R. O. E. Davis and L. B. Olmstead. A mixture of hydrogen and nitrogen in the proportion of three to one is obtained by decomposing liquid ammonia. This is accomplished by passing the ammonia over heated iron shavings and steel wool. The decomposition is almost complete with the apparatus described, furnishing about 1.3 cu. ft. of gas per minute.

Explosion of gases used in ammonia synthesis: R. O. E. Davis. A description is given of an explosion which occurred in a cotton filter used to remove oil and water spray from mixed nitrogen and hydrogen at a hundred atmospheres pressure.

Some chemical needs of the vegetable oil industry: David Wesson.

Charles L. Parsons,
Secretary

(*To be continued*)

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